

## CLAIMS:

1. Method for shimming a main magnetic field in a magnetic resonance device, the method comprising the following steps:
  - a) generating at least one spatially selective radio frequency pulse (RF) for exciting nuclear spin magnetization within a restricted region of the examination volume of the magnetic resonance device;
  - b) acquiring a magnetic resonance signal (ES) that is sensitive to the homogeneity of the main magnetic field;
  - c) applying electric currents (SZ, SX, SY) to a shim coil arrangement of the magnetic resonance device such that the main magnetic field is adjusted in accordance to the properties of the magnetic resonance signal (ES) acquired in step b);
- 10 characterized in that the electric currents (SZ, SX, SY) applied to the shim coil arrangement are at least partially switched off during the generation of the spatially selective radio frequency pulse (RF) in step a) and switched on during the acquisition of the magnetic resonance signal (ES) in step b).
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2. Method according to claim 1, characterized in that steps a) to c) are repeated such that the homogeneity of the main magnetic field is optimized iteratively.
3. Method according to claim 1 or 2, characterized in that a linear gradient
- 20 magnetic field (GZ, GX, GY) is temporarily superimposed upon the radio frequency pulse (RF) in step a) for the purpose of slice selection by means of a gradient coil arrangement of the magnetic resonance device.
4. Method according to claim 3, characterized in that the electrical currents (SZ,
- 25 SX, SY) applied to the shim coil arrangement in step c) generate linear gradient magnetic fields within the examination volume of the magnetic resonance device.
5. Method according to claim 4, characterized in that only those currents (SZ, SX, SY) applied to the shim coil arrangement are switched off during the generation of the

spatially selective radio frequency pulse (RF) in step a) which generate linear gradient magnetic fields in the direction of the slice-selection gradient (GZ, GX, SY) superimposed upon the radio frequency pulse (RF).

- 5     6.             Method according to any one of claims 1 to 5, characterized in that the main magnetic field is adjusted in step c) such that the amplitude of the acquired magnetic resonance signal (ES) is maximized and/or the spectral width of the magnetic resonance signal (ES) is minimized.
- 10    7.             Device for magnetic resonance imaging of an object (9) placed in a stationary and substantially homogeneous main magnetic field, the device comprising a main magnetic coil (2) for establishing the main magnetic field, a shim coil arrangement (3) for compensating for inhomogeneities of the main magnetic field, gradient coils (4, 5, 6) for generating magnetic field gradients superimposed upon the main magnetic field, a radio  
15    frequency antenna (8) for radiating radio frequency pulses towards the object (9), control means (13) for controlling electric currents applied to the shim coil arrangement (3) and for controlling the generation of the magnetic field gradients and the radio frequency pulses, receiving means for receiving and sampling magnetic resonance signals generated by sequences of radio frequency pulses and magnetic field gradient pulses, and reconstruction  
20    means (14) for forming an image from the signal samples, characterized in that the control means (13) comprises a programming with a description of a shimming procedure according to a method of any one of claims 1 to 6.
8.             Computer program with a program code, characterized in that the program  
25    code enables a shimming procedure according to a method of any one of claims 1 to 6 to be carried out on a magnetic resonance device.